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**.01 GENERAL**

This specification covers the requirements for hot mix asphalt designed using the Superpave method, including warm mixes.

Unless otherwise amended herein, the design, materials, production and placement of hot mix asphalt shall conform to the following:

- OPSS.MUNI 310 – Construction Specification for Hot Mix Asphalt, including Appendix C
- OPSS.MUNI 1003 – Material Specification for Aggregates – Hot Mix Asphalt
- OPSS.MUNI 1101 - Material Specification for Performance Graded Asphalt Cement
- OPSS.MUNI 1151- Material Specification for Superpave and Stone Mastic Asphalt Mixtures.

**.02 SUPERPAVE MIXES**

Superpave types shall be as specified in the contract documents, shall be in accordance with Tables 1 and 2 of OPSS.MUNI 1151, and shall be approved prior to use.

The Performance Graded Asphalt Cement (PGAC) shall be in accordance with OPSS.MUNI.1101, as amended by this specification.

**.02.01 Design Requirements**

**.02.01.01 Submission and Design Requirements**

The design of Superpave mixes shall be in accordance with the requirements of OPSS.MUNI 1151 Material Specification for Superpave and Stone Mastic Asphalt Mixtures, as amended by this specification.

**.02.01.02 Mix Requirements for Design Purposes – Hot Mix and Warm Mix**

1151.04.01 of OPSS.MUNI 1151 is amended by the addition of the following:

Asphalt cement shall be performance graded asphalt cement and shall be as described in section .02.02.02.

The Contractor shall design, produce and place asphalt in accordance with the following:

- All surface and binder course asphalt produced and placed on or after November 1 of any year shall be a Warm Mix;
- Where weather conditions at the time of paving prevent the placement of Hot Mix asphalt in accordance with OPSS temperature requirements, a Warm Mix shall be used.

Warm mix asphalt shall be in accordance with section 02.01.03.

**.02.01.03 Additional Design Requirements for Warm Mix Asphalt**

OPSS.MUNI 310.04.01 of OPSS.MUNI 310 - Appendix 310-C is hereby deleted and replaced with the following:

The Contractor shall be responsible for the following:

- a) Using an approved WMA additive listed below:
  - i) Advera
  - ii) Evotherm
  - iii) Hyper Therm
  - iv) Sasobit
  - v) SonneWarmix
- b) Preparation of the mix design and reporting of all testing results in accordance with test method LS-318 Practice for the Design of Superpave Warm Mix Asphalt (WMA).
- c) Any WMA technology not listed in a) above shall be subject to review and approval by the City.
- d) The WMA mix design and the job mix formula at the anticipated WMA production temperature, both of which shall be according to the requirements of this specification.
- e) Ensuring that, during the development and verification of the WMA mix design, the WMA technology does not adversely affect the asphalt cement performance grade and the WMA mixture performance.
- f) Moisture content of the aggregate coming from the dryers shall not exceed 0.5%.

**.02.01.04 Submission Requirements – Warm Mix Asphalt**

OPSS.MUNI 310.04.02 of OPSS.MUNI 310 - Appendix 310-C is deleted and replaced by following:

A minimum of 4 weeks prior to paving with WMA, the following information shall be submitted to the Project Manager, in writing:

- a) The name of the supplier and the approved WMA technology selected.
- b) All test results required under LS-318 and any other details on how the requirements of this specification shall be met.
- c) If applicable, the type and dosage of WMA additives, how the additives are to be incorporated to produce the WMA, and the WMA technology supplier's established recommendations for usage.

- d) Where a proposed technology is not currently approved, the Contractor shall submit the following information a minimum of 4 weeks prior to proposed paving dates for review and approval:
  - i) Name of process, manufacturer, type of process and the technology group;
  - ii) Manufacturer's recommendations including:
    - a) Process description and mix design recommendations;
    - b) Required plant modification and hauling recommendations;
    - c) Mixing and compaction temperatures;
    - d) Construction aspects, if any differences from conventional HMA paving besides temperatures.
  - iii) Projects where the process has been used including:
    - a) Client including contact information (telephone, email);
    - b) Mix designs;
    - c) Date and location of construction;
    - d) To date performance.

Where the proposed technology is not approved, the Contractor shall be required to supply and place an approved technology.

**.02.01.05 Superpave Mix Verification**

1151.04.02.02.02 of OPSS.MUNI 1151 is amended by the addition of the following:

After receiving the asphalt mix design from the Contractor's own laboratory or from a hired firm's laboratory, the Contractor shall provide asphalt mix verification test results in accordance with the following criteria:

- a) The tests must be performed by a laboratory independent from the firm producing the asphalt mix design.
- b) The laboratory performing verification testing must have a valid "Certificate of Conformance" issued by the Canadian Council of Independent Laboratories (CCIL) Asphalt Laboratory Certification Program and be qualified under the following categories:
  - i) Asphalt Mix Design – Marshall and Superpave Methods (Type A)
  - ii) Asphalt Mix Compliance – Marshall and Superpave Methods (Type B)

All verification testing must be reviewed and accepted by the City of Hamilton prior to the start of any paving operations.

The mix design shall be submitted for acceptance at least 4 weeks before construction. The mix design shall be reviewed and approved by the City.

Prior to construction, at the discretion of the Project Manager, a trial batch may be required for verification and approval.

The submitted mix design shall include the JMF and the documents listed in Section 1151.04.05 of OPS 1151 MUNI. The mix design that does not include the required documents will not be reviewed and accepted.

**.02.01.06 Asphalt Cement Requirements**

The asphalt cement content of the approved JMF shall be equivalent to or greater than those shown in Table 800-1.

**TABLE 800-1  
Superpave Minimum Asphalt Cement Content**

Mix Type	Minimum Asphalt Cement Content for JMF
Superpave 9.5	5.5
Superpave 12.5	5.0
Superpave 19mm	4.8
Superpave 25mm or greater	4.6

**.02.01.07 JMF Adjustments**

1151.04.02.04 of OPSS.MUNI 1151 is amended by the addition of the following:

The Contractor shall be permitted to adjust the JMF to more closely reflect the mix being produced. The number of field adjustments to the JMF shall be limited to three for each mix design submitted, one prior to the start of production and a maximum of two during production. Field adjustments to the JMF shall be limited in scope such that:

- a) The net impact of all field adjustments to the JMF does not exceed any of the maximum field adjustments to the JMF in Table 8 of OPSS.MUNI 1151 in comparison to the original JMF submitted
- b) Does not drop below the Minimum Asphalt Cement content in Table 800-1.

JMF adjustments shall not be accepted once placement of the specific mix type has been completed.

**.02.02 Materials**

**.02.02.01 Aggregate**

Aggregates used shall be in accordance with OPSS.MUNI 1003 Material Specification for Aggregates – Hot Mix Asphalt.

**.02.02.02 Performance Graded Asphalt Cement (PGAC)**

Performance Graded Asphalt Cement shall be in accordance with OPSS.MUNI 1101 - Material Specification for Performance Graded Asphalt Cement, as amended by the following:

1101.05 of OPSS.MUNI 1101 is amended by the addition of the following:

The basic grade of asphalt cement shall be PG 58–28.

In accordance with ASTM M332 standard, the dynamic shear, T 315,  $G^* \sin \delta$  carried out on the residue from pressurized aging vessel (PAV), shall be maximum 6,000 kPa for 58H,V, E -28.

**1101.08.03 of OPSS.MUNI 1101 is amended by the addition of the following:**

A sample of asphalt cement shall be taken at the beginning of the asphalt paving project. At the discretion of the Project Manager, more samples may be required, for instance to represent 1,000 tons of a particular asphalt mix.

**Table 1 of OPSS.MUNI 1101 is deleted in its entirety and replaced with the following:**

**Table 800-2  
Additional testing requirements and acceptance criteria for PGAC grades**

Property and Attributes (Unit)	Test Method	Results Reported Rounded to the Nearest	Acceptance Criteria	Rejectable
Ash Content, % by mass of residue (%)	LS-227	0.1	≤ 0.6	>0.6
Non-recoverable creep compliance at 3.2 kPa (Jnr-3.2) (kPa-1) when PGAC 58H-28 is specified	Multiple Stress Creep Recovery (MSCR) testing according to AASHTO T 350 testing conducted at a temperature of 58 °C	0.01	≤ 2.0	> 2.0
Non-recoverable creep compliance at 3.2 kPa (Jnr-3.2) (kPa-1) when PGAC 58V-28 is specified		0.01	≤ 1.0	> 1.0
Non-recoverable creep compliance at 3.2 kPa (Jnr-3.2) (kPa-1) when PGAC 58E-28 is specified		0.01	≤ 0.5	> 0.5
Average percent recovery at 3.2 kPa (R3.2) (%)		0.1	> the lesser of [(29.371) (Jnr-3.2) <sup>-0.2633</sup> ] or 55	≤ the lesser of [(29.371) (Jnr-3.2) <sup>-0.2633</sup> -10] or 45
Percent difference in non-recoverable creep compliance between 0.1 kPa and 3.2 kPa, Jnrdiff (%)		0.1	N/A Testing carried out only for information purpose	

For residential street pavements, regular PG58-28 asphalt cement will be used with no polymer modification and no MSCR testing required.

Guidelines for the selection of PGAC graded using Multiple Stress Creep Recovery (MSCR) test is given in Table 800-3 below.

**Table 800-3  
Guidelines for Selection of PGAC Graded Using MSCR Test**

Road Type	Recommended PGAC Grade Using MSCR Test	Optional Grade Increase (Note 1)
Urban Freeway	58V-28	N/A
Rural Freeway Urban Arterial	58H-28	58V-28
Rural Arterial Urban Collector	Consider specifying 58H-28 if truck traffic is greater than 20% of AADT	58V-28
Rural Collector Urban/Suburban Collector	58-28	58H-28 or 58V-28
Toll Plaza Port Facility Dedicated Transit ways Truck Marshalling Yards (standing traffic)	58E-28	N/A
<p>Notes:</p> <p>A. It is recommended that MSCR graded PGAC is used in both surface and top binder courses, i.e. top 80 mm to 100 mm of hot mix.</p> <p>1. Consideration should be given to an increase in the high temperature traffic level for roadways which experience a high percentage of Trucks or bus traffic at slow operating speeds, frequent stops and starts, and historical concerns with instability rutting.</p>		

**.02.02.03 Reclaimed Asphalt Pavement (RAP)**

**1151.04.01.01 of OPSS.MUNI 1101 is amended by the addition of the following:**

The amount of RAP allowable by mass in a mix will be calculated by the Binder Replacement method according to the following formula:

$$\% \text{ Binder Replacement} = \frac{\% \text{ Binder Content of RAP} \times \% \text{ RAP in Mix}}{\% \text{ Total Binder Content of Mix}} \times 100\%$$

RAP is not permitted in SMA, 12.5 FC1, and 12.5 FC2 mixes, unless specified in the Contract Documents. Up to 15% of RAP is allowed in other surface course mixes and up to 15% of RAP is allowed in binder course mixes, by Binder Replacement.



**.02.03 Construction**

The supply and placement of hot mix and warm mix asphalt shall be in accordance with the following:

- a) OPSS.MUNI 310 Construction Specification for Hot Mix Asphalt, as amended;
- b) OPSS.MUNI 310 - Appendix C for the placement of warm mix asphalt, as amended.

**.02.03.01 Pre-pave Meeting**

At least one (1) week prior to any scheduled milling or paving operation to occur, a mandatory Pre-pave meeting shall be held. The Contractor shall ensure that all required documentation relating to the milling and paving operations has been submitted for review and approved prior to the meeting. The items shall include, but are not limited to, the following:

- a) Approved mix designs and Job Mix Formulas;
- b) Proposed milling and paving dates and paving equipment to be used;
- c) Asphalt placement and compaction rolling patterns;
- d) Roadway, lane closures and vehicle access restrictions;
- e) Tack coat scheduling and application patterns.

**.02.03.02 Asphalt Plant Inspection**

The Contractor shall permit access to the City's inspector in order to monitor the asphalt mix production, particularly the amount of Reclaimed Asphalt Pavement (RAP) added. The stockpiles of aggregates and RAP shall be clearly labelled / identified.

The asphalt plant's health and safety procedures that may be required shall be provided by the Contractor in advance.

Upon request from the Project Manager, the Contractor shall supply copies of plant records during asphalt production that will allow a demonstration of the proportion of RAP added to the mix.

**.02.03.03 Tack Coat**

Prior to the application of any of surface or binder coarse asphalt, tack coat shall be applied. Hot-mix and warm-mix asphalt can be placed only after the tack coat is cured (changes the colour from brown to black and becomes sticky).

**.02.03.04 Placement of Binder and Surface Course Asphalt**

Any type of asphalt having a thickness of 80mm or more shall be placed in a minimum of 2 lifts unless otherwise directed by the Project Manager.

The finished elevation of the surface course asphalt shall be placed so as to be flush with the lower edge of curb at the depressed portion of all wheelchair

ramps. The surface course asphalt shall slope down and away from the curb to form a gutter line in front of the wheelchair ramp.

**.02.03.05 Binder Course Asphalt – Temporary Ramping**

When the surface course asphalt is to be delayed or placed the following year, temporary asphalt ramps shall be placed at all wheelchair ramps and driveway approaches. The top of the temporary asphalt ramps shall be placed so as to be flush with the lower edge of curb at the depressed portion of all wheelchair ramps and driveway approaches. The temporary asphalt ramps shall be removed at the time of placement of the surface course asphalt at no additional cost.

**.02.03.06 Use of Paving Equipment – Paving in Echelon**

OPSS.MUNI 310.07.07 is amended with the addition of the following paragraph:

Paving in Echelon is mandatory for the placement of binder and surface course asphalt. The pavers shall be operated at the same time and maintain a distance of not more than 50m from each other so that a hot joint is obtained between the lanes of mixtures being placed. The Contractor shall supply sufficient personnel to adequately control both spreading operations simultaneously.

Where the entire width of the proposed pavement platform cannot be paved in echelon with 2 pavers, one longitudinal construction joint is permitted. Each half of the road shall be paved in echelon resulting in only one longitudinal joint in the binder and surface courses located at the centreline of the road. The joint shall be located to ensure that it does not align with the wheel path of traffic.

**.02.03.07 Asphalt Material Transfer Vehicle**

OPSS.MUNI 310.07.07 is amended with the addition of the following paragraph:

A Shuttle Buggy® Asphalt Material Transfer Vehicle (AMTV) is required for all paving operations, including paving using only one paver. The use of an AMTV will be paid for by the tonne.

**.02.03.08 Re-Heating and Compaction of Longitudinal Joints**

OPSS.MUNI 310.07.07 is amended with the addition of the following paragraph:

For surface course, the Contractor shall use an approved method of re-heating, re-working and compacting all centreline longitudinal cold joints. Pricing shall be based on an infra-red heating system capable of maintaining a minimum temperature of 93° C to produce a welded joint, without scorching or burning the mix.

All re-heating methods shall be approved prior to the start of any asphalt placement.

The density of the mix at any longitudinal joint shall be within 1.5 percent of the mainline mat density. Compaction of longitudinal joint shall be measured within 0.3 m from the joint.

**.02.03.09 Review of Longitudinal Joint Quality**

Prior to the expiry of the 24 month maintenance period, all joints in surface course asphalt shall be reviewed. The review will consider weld quality, proper compaction and separation. All joints showing signs of separation or poor welding shall be re-heated and compacted to achieve a welded joint. All repairs to longitudinal joints shall be at the cost of the Contractor.

**.02.03.10 Aggregate Gradation and Asphalt Cement Content Acceptance**

OPSS.MUNI 310.08.04 is deleted and replaced by the following:

If the HMA is borderline for aggregate gradation or asphalt cement content specified in Table 800-4, the Contractor shall take immediate corrective action through process control at the HMA plant. A total of three consecutive borderline test results for any attribute representing up to 1,000 tonnes of HMA production shall result in the work being deemed rejectable.

**TABLE 800-4  
Production Tolerances on the Job-Mix Formula  
Aggregate Gradation and Asphalt Cement Content**

Mix	Attribute	Tolerances on the Job-Mix Formula %		
		(Note 1)		
		Acceptable	Borderline	Rejectable
Surface Course	DLS, 4.75mm sieve size	< 5.0	5.0 to 7.5	>7.5
	600 µm sieve size	< 3.5	3.5 to 5.0	>5.0
	75 µm sieve size	< 2.0	2.0 to 3.0	>3.0
Binder and Levelling Courses	DLS, 4.75mm sieve size	< 7.0	7.0 to 10.0	>10.0
	600 µm sieve size	< 4.5	4.5 to 6.0	>6.0
	75 µm sieve size	< 2.0	2.0 to 3.0	>3.0
All Mixes	Asphalt Cement Content	< 0.20	0.2 to 0.30	>0.30
Note 1: Tolerances on the job-mix formula apply as both plus and minus from the job-mix formula percent.				

Rejected HMA due to aggregate gradation, such as non-compliance on the DLS 4.75mm, 600 µm, or 75 µm sieve sizes, or non-compliance due to the asphalt cement content specified in Table 800-4, shall be subject to review and corrective actions, including but not limited to payment reduction, or material removal and replacement with acceptable HMA at the Contractor's expense.

The asphalt cement content and aggregate gradation shall be determined for each day's mix production for a given plant location on the basis of the sampling frequency criteria in Table 800-5.

Table 6 found in OPSS.MUNI 310 is hereby deleted and replaced by Table 800-5 below.

**TABLE 800-5**  
**Criteria for HMA Sampling and Testing**

MIX TYPE	ASPHALT PLANT DAILY PRODUCTION FOR PROJECT	MINIMUM SET OF TEST SAMPLES
Surface Course	$\leq$ 1000 tonnes $>$ 1000 tonnes	3  One additional sample per 250 tonnes or part thereof
Binder Course	$\leq$ 1000 tonnes $>$ 1000 tonnes	3  One additional sample per 500 tonnes or part thereof

Note:

1. The Project manager may reduce the sampling/testing frequency for HMA that is consistently being produced to the specification requirements, or for very low volume
2. A set of test samples are to include a QC sample(for the contractor), a QA sample (for The City) and a Hold (for The City)

Field samples for quality assurance and/or quality control testing shall be Quarter Master Samples obtained during asphalt placement and compaction procedures that meet the minimum sample size of 20 kg as given in OPSS.MUNI 310, Table 6. Samples obtained from the spreader hopper or truck box shall not be used for QA/QC testing.

Samples shall be taken and collected by the contractor at locations determined by the Project Manager or the City's representative. These samples shall be representative of the paving operations. At each location, three samples shall be taken and packed in separate cardboard boxes supplied by the paving contractor. The box samples shall be numbered in sequence for a given contract,

and shall be marked to identify each individually. In addition, each sample shall be labelled to include the following minimum identification:

1. Contract Number;
2. Location of Sampling;
3. Date and Time of sampling;
4. Asphalt type;
5. Load number;
6. Load tonnage.

Two of the samples from each sample location shall be the property of The City.

**.02.03.11 Air Voids Acceptance for HMA Production**

The production of air voids for all HMA mixes shall be evaluated according to Table 800-6.

Table 9 found in OPSS.MUNI 310 is hereby deleted and replaced by Table 800-6 below.

**TABLE 800-6  
Laboratory Air Void Criteria for Hot Mix Asphalt Production (LS-265)**

Mix	Air Voids (%)		
	Acceptable	Borderline	Rejectable
All Mixes	3.0 to 5.0	2.0 to 2.9 and 5.1 to 6.0	< 2.0 and > 6.0

If the HMA is borderline for air voids as specified in Table 800-6, the Contractor shall be notified in writing and shall take immediate corrective action through process control at the HMA plant. A total of three consecutive borderline test results representing up to 1,000 tonnes of HMA production shall result in the work being deemed rejectable.

Rejected HMA due to air voids shall be subject to review and corrective actions, including but not limited to payment reduction, or material removal and replacement with acceptable HMA at the Contractor's expense.

**.02.03.12 Referee Testing**

Where there is a discrepancy between the QC and QA results and the Contractor wishes to request a referee, the QC sample results will be provided within 30 days of receiving the QA results. If the HMA/WMA is deemed rejectable according to Table 800-4 or 800-6, both the City and the Contractor shall review, agree, and identify the limits of rejected HMA/WMA that has been placed. Referee samples within the limits of the affected area shall be delivered by the City to a mutually agreed upon third party referee laboratory to verify

aggregate gradation, asphalt cement, air voids content or a combination of all three. When the results from the referee samples are deemed rejectable according to Table 800-4 or 800-6, the HMA/WMA pavement shall be removed and replaced with acceptable HMA/WMA pavement at the contractor's expense or an appropriate payment reduction may be applied.

Referee testing undertaken to resolve a dispute shall be at no extra cost to the City if the referee test results confirm that the HMA/WMA is deemed borderline or rejectable according Table 800-4 and 800-6 or AC does not meet the requirements of Table 800-2.

### **.02.03.13 Asphalt Layer Segregation**

All hot mix asphalt shall be inspected for segregation in accordance with the following:

#### **.02.03.13.01 Types of Segregation**

Segregation consists of areas with comparatively coarser texture than that of the surrounding pavement. All segregation is deemed to be deficient materials and/or workmanship, regardless of the type, location, cause or severity. The Contractor shall provide traffic control, as required, to conduct all segregation assessments.

Two main types of segregation are recognized:

Mid-lane Segregation: consists of any continuous or semi-continuous longitudinal mark or "streak", typically no greater than 300mm in width. Such segregation is often found in the middle of the lane, in the vicinity of a paver's gearbox, but may be located anywhere across the width of the lane.

Other Segregation: consists of discrete areas or patches of regular, irregular or chevron shape.

#### **.02.03.13.02 Severity of Segregation**

The severity of segregation is categorized as follows:

Slight Segregation: The pavement matrix is in place between the coarse aggregate particles; however there are slightly more coarse aggregate particles in comparison with the surrounding acceptable mix.

Medium Segregation: The pavement has significantly more coarse aggregate particles than the surrounding acceptable mat and usually exhibits some lack of surface matrix.

Severe Segregation: The pavement appears very coarse, with coarse aggregate particle against coarse aggregate particle and the pavement has little or no matrix.

### **.02.03.13.03 Paving Segregation**

If the Contractor fails to prevent slight segregation in paving, the Project Manager will issue a written warning and request the Contractor to address the problem. The Contractor may be allowed to continue paving at the discretion of the Project Manager. If medium segregation is observed, the paving operation will be stopped. The Contractor shall prove to the satisfaction of the Project Manager that the paving can be continued without any medium segregation.

### **.02.03.13.04 Correction of Segregation**

If the Contractor's actions fail to prevent continued slight to medium segregation from any source, the Project Manager may instruct the Contractor to cease paving until the problem has been corrected and the City shall not be held responsible for any additional costs that the Contractor may incur as a result.

From the time that the Contractor receives notification of mid-lane segregation, the Contractor will be allowed a maximum of 100 tonnes of mix to be placed on the Contract, in order to demonstrate the effectiveness of any repairs and/or adjustments that have been made to a defective paver.

The Contractor shall demonstrate the repairs and/or adjustments to the paver, which is acceptable to the Project Manager. If the Contractor is unable to eliminate segregation to the satisfaction of the Project Manager, by making repairs or adjustments to the paver within the allowable 100 tonnes of hot mix, then the Contractor shall discontinue the use of that machine and/or material.

### **.02.03.13.05 Mid-Lane Segregation**

Medium to severe mid-lane segregation shall be repaired by removal and replacement at no cost to the City. Slight mid-lane segregation will be accepted into the work with no payment reduction.

### **.02.03.13.06 Other Segregation**

The disposition of Other Segregation shall be as follows:

Slight Segregation: Slightly segregated mix will be accepted into the work with no payment reduction.

Medium Segregation: Medium segregation in all HMA lifts shall be repaired at the direction of the Project Manager at no cost to the City.

Severe Segregation: All severely segregated mix shall be repaired by removal and replacement at no cost to the City.

Levelling or padding courses with a total thickness which is less than that is normally placed in a lift of hot mix (i.e., usually 40mm), that is not machine-laid and any areas of "handwork" shall not be assessed on the basis of segregation but on the basis of other workmanship-related problems. However, if they deteriorate prior to being overlaid by another pavement course, the Project

Manager will assess the causes of the deterioration before determining responsibility for the cost of repairs.

**.02.03.13.07 Repairs**

All repairs shall be subjected to the approval by the Project Manager.

Repairs shall consist of removal and replacement with new hot mix or a hot mix overlay, where permitted.

Repairs for segregated hot mix shall be full lane or shoulder width. However, localized repairs may be permissible for mid-lane segregation in binder courses provided hot joints are used or the mat is still hot.

A paver shall be used for all repairs except those where localized repairs are allowed.

Where localized repairs are allowed for mid-lane segregation in binder courses, these repairs shall be:

- Less than or equal to 300mm in width;
- To the full depth of the subject lift; and
- Entirely tack-coated.

Hot mix used in all repairs shall meet the requirements specified for the tender item in the Contract. All repairs shall be done in a workmanlike manner complying with all requirements for placing hot mix stated in the Contract. All repaired areas must be entirely tack-coated and all transverse joints in surface course repairs must butt up to a vertical face.

For surface and binder courses, all repairs for remedial work due to visually defective mix, including pavement removal and replacement, overlays where permitted, additional shouldering, traffic control and any other work which has to be redone such as line painting shall be made entirely at the Contractor's expense.